

SECTION 34: WATER SERVICE INSTALLATION

34-01 SCOPE. This Work shall consist of furnishing and installing all materials required to complete the installation and testing of the service from the water main to the meter box, including installation of the meter box and tapping or cutting into the existing main.

34-02 MATERIALS.

34-02.01 Brass Goods. Brass goods shall be as manufactured by the Mueller Company, James-Jones Company, AY McDonald, Ford Meter Box Company or an approved equal from the latest edition of the City's Approved Material List. Identical items from either of the above-named sources may be substituted.

a. Corporation Stops. Mueller No. H-15010 with 1/8 bend coupling, gasket and coupling nut or an approved equal from the latest edition of the City's Approved Material List.

b. Curb Stops (Water Meter Stops).

1. All curb stops shall be angle ball valve type with lock wings. Straight ball valve curb stops will be allowed on manifolds and special installations only.

2. 3/4" angle ball valve curb stops for 3/4" meters:

Ford - BA23-342W - 1" copper flare inlet x 3/4" meter nut,

Mueller - B24255-R-3 - 1" copper flare inlet x 3/4" meter nut,

McDonald - 4642-B - 1" copper flare inlet x 3/4" meter nut, or an approved equal from the latest edition of the City's Approved Material List.

3. 1" angle ball valve curb stops for 1" meters:

Ford - BA23-444W - 1" copper flare inlet x 1" meter nut,

Mueller - B24255-3 - 1" copper flare inlet x 1" meter nut,

McDonald - 4602-B - 1" copper flare inlet x 1" meter nut, or an approved equal from the latest edition of the City's Approved Material List.

4. 1½" and 2" angle ball valve curb stops for 1½" and 2" meters:
 Ford - FV13-777W - 2" FIP x 1½" or 2" FIP,
 Mueller - B24286-3 - 2" FIP x 1½" or 2" meter flange,
 McDonald - 4602-B - 2" - 2" flare x 1½" or 2" meter flange, or an approved equal from the latest edition of the City's Approved Material List.
5. ¾" straight ball valve curb stops for ¾" meters:
 Ford - B13-332-W - ¾" FIP x ¾" meter nut,
 Mueller - B24351-3 - ¾" FIP x ¾" meter nut,
 McDonald - 6101MW-¾" - ¾" FIP x ¾" meter nut,
 or an approved equal from the latest edition of the City's Approved Material List.
6. 1" straight ball valve curb stops for 1" meters:
 Ford - B13-444W - 1" FIP x 1" meter nut,
 Mueller - B24351-3-1" - 1" FIP x 1" meter nut,
 McDonald - 6101MW-1" - 1" FIP x 1" meter nut,
 or an approved equal from the latest edition of the City's Approved Material List.
7. 1½" and 2" straight ball valve curb stops for 1½" and 2" meters:
 Ford - B11-777W - 2" FIP x 1½" or 2" FIP,
 Mueller - B-24337-3 - 2" FIP x 1½" or 2" meter flange,
 McDonald - 6101MW-2" - 2" FIP x 1½" or 2" meter flange, or an approved equal from the latest edition of the City's Approved Material List.

c. Tubing Splice Fittings.

1. Three-part union, copper to copper, Mueller No. H-15400, or an approved equal from the latest edition of the City's Approved Material List.
2. Quarter bend coupling, Mueller No. H-15525, or an approved equal from the latest edition of the City's Approved Material List.

34-02.02 Copper Tubing Services. Service runs of sizes two inches (2") and smaller shall be of Type K soft copper tubing conforming to ASTM Specification B88 or Federal Specification WW-T-799. All copper and brass shall be primed and taped as per Standard Detail D-31.

34-02.03 Ductile Iron and PVC Pipe Services. Service runs of sizes four inches (4") and larger shall be Class 200 polyvinylchloride pipe conforming to ANSI/AWWA Standard C900 or Class 52 ductile iron pipe conforming to AWWA Standards C150 and C151 with cement lining conforming to AWWA Standard C104. Fittings shall be cement lined and conform to AWWA Standards C104 and C110. All ductile iron service runs shall have bonded joints and shall be wrapped in an 8-mil. thick polyethylene film sleeve.

34-02.04 Service Clamps and Tapping Sleeves.

a. Service Clamps (Service Saddles). For asbestos-cement pipe, use double-strap style with bronze body tapped with C.C. tapered threads, bronze straps flattened on one side for pipe protection and shaped to give a maximum resistance to corrosion. For ductile iron pipe, use stainless steel full circle clamp with tapped outlet provide 7-1/2" (minimum) wide band for 1" taps, and 12" (minimum) for 2" taps. Gasket shall be full faced of Buna-N, NBR Rubber, or an approved equal from the latest edition of the City's Approved Material List. Entire service saddle or full circle clamp shall be coated and wrapped according to Standard Details D-31 and D-32. Stainless steel service clamps (saddles) shall be as manufactured by Sensus Technology, JCM Model 102, or an approved equal from the latest edition of the City's Approved Material List, as approved by the Engineer, and shall be of the proper diameter as designated by the manufacturer for the outside diameter of the pipe on which it will be mounted. No double-strap service clamps shall be used for plastic mains. Service saddles to be used on plastic mains shall be approved by the Engineer.

b. Tapping Sleeves. The following tapping sleeves are acceptable:

1. Tapping sleeves shall be constructed entirely of Type 304 stainless steel including outlet flange, bolts and nuts. Tapping sleeves shall completely surround the pipe to be tapped and shall be fully lined with a waffle pattern gasket. Tapping sleeves shall be model FAST as manufactured by Ford Meter Box Company or an approved equal from the latest edition of the City's Approved Material List.

2. Tapping sleeves shall be epoxy coated model FTSC as manufactured by Ford Meter Box Company or an approved equal from the latest edition of the City's Approved Material List.

34-02.05 Gate Valves. Gate valves shall be Mueller Model No. RSVG A-2370 epoxy coated resilient seat gate valve with stainless steel bolts, "O" ring seals, nonrising stem, open left, two-inch (2") brass square wrench nut and with 304 stainless steel retainer nut inside, in accordance with AWWA C509, or an approved equal from the latest edition of the City's Approved Material List. 304 stainless steel bolts and nuts shall be used for flanged joint and high-strength low-

alloy steel in accordance with AWWA C111 bolts and nuts shall be used for mechanical joints. Tapping valves shall be Mueller RSVG H-687, or an approved equal from the latest edition of the City's Approved Material List.

34-02.06 Gate Valve Boxes. Gate valve boxes shall be in accordance with Paragraph 33-02.06, "Gate Valve Boxes," of these Standard Provisions.

34-02.07 Water Meters.

a. Meters for Potable Water.

1. Two inch (2") and smaller sizes: Badger Recordall Disc Series or an approved equal.

Meter shall consist of a bronze body and bottom plate, a removable radio-read type RTR register, an Itron Pit ERT antenna module, and register-to-antenna connector wires. The ERT antenna module shall be preprogrammed in wake-up mode and RTR register shall have factory-installed serial number on its lid before shipment from the distributor. One and one-half inch (1-1/2") and two-inch (2") meters shall have flanged ends. The meter shall register water flow in cubic feet

2. Three inch (3") and larger sizes: Badger Turbo Series or approved equal.

Meter shall come with an internal or external strainer, a removable radio-read type RTR register, an Itron Pit ERT antenna module, and register-to-antenna connector wires. The ERT antenna module shall be preprogrammed in wakeup mode and RTR register shall have factory-installed serial number on its lid before shipment from the distributor.

b. Meters for Reclaimed Water.

All meters for reclaimed water shall be Badger reclaimed water meters or approved equal.

All reclaimed water meters shall conform to the requirements for potable water meters as described in Section 34-02.07.a above, except that the reclaimed water meters shall have purple registers and lids with the word "RECLAIMED" engraved or cast on the meter housings and the nonpotable water symbol on the register lids.

34-02.08 Meter Boxes. Meter boxes shall be as follows, or approved equal from the latest edition of the City's Approved Material List.

<u>Service Size</u>	<u>Traffic*</u> or <u>Nontraffic</u>	<u>Manufacturer</u>	<u>Box No.</u>	<u>Cover or Lid No.</u>
1"	Nontraffic	Brooks	37	37S
	Nontraffic	Christy	B12BOX	B12S
	Traffic*	Christy	B1730BOX	B1730-51G
2"	Nontraffic	Brooks	65	65-S
	Nontraffic	Christy	B36BOX	B36E
	Traffic*	Christy	B1730BOX	B1730-51G
3" or 4"	Nontraffic	Christy	B48BOX	B48M2
	Traffic*	Christy	B48BOX	B48-62G
6" and larger		Brooks	744A	7" x 14" Rect. Reading Lid

* Required where subject to vehicular traffic and prohibited in nontraffic areas.

For meters over four inches (4") in size, the box type will be designated by the Engineer to suit the specific application.

34-02.09 Backflow Prevention Assemblies for Domestic or Irrigation Water Services. All backflow prevention assemblies for domestic or irrigation services shall be reduced pressure type. Three-quarters of an inch (3/4") to two-inch (2") backflow prevention assemblies shall have full-port domestic ball valves with threaded ends. Two-and-one-half inch (2½") to ten-inch (10") backflow prevention assemblies shall have NRS flanged resilient seated gate valves.

Backflow prevention assemblies for domestic and irrigation water services shall be Reduced Pressure type as follows, or an approved equal assembly:

<u>COMPANY</u>	<u>MODEL</u>	<u>SIZE</u>
Watts	909	3/4"to 10"
	919	3/4"to 10"
	009	3/4" to 10"
Febco	825Y	3/4" to 10"
Conbraco	40-200 Series	3/4" to 10"

Wilkins	975XL	3/4" to 10"
	375	3/4" to 10"
	475	3/4" to 10"

34-02.10 Fire Service Backflow Prevention Assemblies. All backflow prevention assemblies for fire services shall be Double Check Detector (DCD) type with cubic feet bypass meters and the services shall have OSY flanged resilient seated valves.

Approved DCD backflow prevention assemblies for fire services shall be as follows or an approved equal:

<u>COMPANY</u>	<u>MODEL</u>	<u>SIZE</u>
Watts	774 DCDA	4" to 10"
	757 DCDA	4" to 10"
Febco	831 DCDA	4" to 10"
	876 NV DCDA	4" to 10"
Conbraco	4S-600 DCDA	4" to 10"
Wilkins	350 DA	4" to 10"
	450 DA	4" to 10"

Exception: When a Class 3 or Class 4 fire service incorporates the use of chemicals in the fire prevention systems or connects to a nonapproved auxiliary water source, the backflow prevention assemblies shall be a reduced pressure backflow prevention assembly.

Approved reduced pressure backflow prevention assemblies shall be as follows or an approved equal or an alternate from the USC Foundation for Cross Connection Control and Hydraulic Research approved list:

<u>COMPANY</u>	<u>MODEL</u>	<u>SIZE</u>
Watts	957 RPDA	4" to 10"
Febco	886 NV RPDA	4" to 10"
Conbraco	40-700 RPDA	4" to 10"

Wilkins	375 RPDA	4" to 10"
	475 RPDA	4" to 10"

34-03 INSTALLATION.

34-03.01 Corporation Stops. All sizes of service taps on ductile iron mains and all sizes on asbestos-cement pipe shall be threaded into a service saddle mounted on the main.

Taps in the water main shall not be located closer to a pipe end than thirty inches (30"). Adjacent taps shall be spaced not less than eighteen inches (18") apart and shall be staggered at forty-five degrees (45°) minimum.

a. **Service Clamp.** The service clamp shall be mounted square with the axis of the pipe and where bales are specified, the bales are to be in full contact with the barrel of the pipe for the length of the formed portion of the bale. The service clamp will also be coated and wrapped according to Standard Details D31 and D32. The tapped outlet shall be positioned forty-five degrees (45°) above the horizontal at a location directly out from the meter setting position. The corporation stop shall be threaded into the saddle clamp and turned to a final position which will make a completely watertight connection and which will locate the operating key above the horizontal. The key nut shall be tightened sufficiently to prevent weeping of the stop under pressure. The water mains shall be drilled using an approved drilling machine mounted on the corporation stop. Drill or shell cutter shall be sharp and have the proper tip for the material to be drilled. Drill sizes for the corporation stops are:

<u>Corporation Stop Size</u>	<u>Drill Size</u>
1"	15/16"
2"	1 7/8"

The corporation stop shall be turned to a final position which will prevent any leakage or weeping and which will locate the operating key above the horizontal.

34-03.02 Copper Tubing. The copper tubing shall be located a minimum of forty-two inches (42") below the finished top-of-curb line and thirty-six inches (36") below the finished roadway surface at the water main. All copper tubing and any brass manifolding shall be primed and taped according to Standard Details D1 and D31. Stamp or grind a "W" on the curb face where the copper tubing crosses under the curb if no "W" currently exists.

Copper tubing shall be installed beneath all existing sidewalk, curb, gutter and improved roadway areas constructed in accordance with the City

standards by means of boring. In the event that excavation of any existing sidewalk, curb, gutter or roadway area becomes necessary, all such excavations shall be backfilled with sand and thoroughly tamped.

The diameter of the boring tool to be used shall be no larger than is necessary to provide sufficient clearance for the copper tubing. Prior to inserting the copper tubing in the bored hole, the end shall be plugged in a manner that will prevent any material from entering the tubing.

When installing the copper tubing, care shall be taken to prevent kinking, flattening or in any other way damaging the tubing.

Splicing of service line runs shall conform to the following: one inch (1") diameter copper tubing, one (1) splice only, located not less than six feet (6') from any service line fitting. One and one-half inch (1-1/2") and two-inch (2") diameter copper tubing, splices spaced at not less than sixteen feet (16') and located not less than six feet (6') from any service line fitting.

Between the side of the water main trench and the corporation stop, an "S"-type curve shall be introduced into the tubing in order to provide flexibility between the service and the water main. Extreme care shall be exercised in the bending operation to prevent kinking or flattening the tubing.

34-03.03 Connection of Fittings to Copper Tubing. The coupling nut on the fitting shall be removed and the end of the copper tubing inserted through the coupling nut. Threads on the fitting shall be lubricated with an approved-type thread lubricant. When the tubing is connected, there shall be no strain exerted by the tubing on the fitting.

34-03.04 Curb Stops (Water Meter Stops). Copper tubing cuts and the location of ninety degree (90°) bends shall be such that the location and elevation of the curb stop will be as shown on the Standard Details. The curb stop outlet shall be so positioned that later meter installation will place no strain on the fittings or tubing.

34-03.05 Flushing and Testing. When the service line has been completed, water from the main shall be flushed through the service with the operating key on the corporation stop and on the curb stop in a full open position. With the service line under pressure, all connections shall be wiped clean and inspected. Leaks or "weeping" are to be corrected before requesting inspection. The Engineer shall be notified of completion of Work and an inspection requested before backfilling any portion of the Work.

Testing procedure for services installed with new water mains shall conform to the requirements of Paragraphs 33-03.14, "Leakage Tests," and 33-03.15, "Disinfecting."

34-03.06 Ductile Iron Pipe Services. Ductile iron pipe services four inches (4") or larger in size shall be installed in accordance with the Standard Details and shall comply with the applicable provisions of this Section. Stamp or grind a "W" on the curb face where the service crosses under the curb if no "W" currently exists.

34-03.07 Polyvinylchloride Pipe Services. Polyvinylchloride pipe services four inches (4") or larger in size shall be installed in special cases when noted on the Plans and approved by the Engineer only. Stamp or grind a "W" on the curb face where the service crosses under the curb if no "W" currently exists.

34-03.08 Meters.

a. Meters shall be installed without the RTR registers and the preprogrammed ERT antennas. RTR registers and the preprogrammed ERT antennas including connector wires shall be shipped directly from the distributor or delivered by the Contractor to the City's Water Meter Section for subsequent installation by City personnel. Ship or deliver the RTR registers and the preprogrammed ERT antennas to:

City of Mountain View Municipal Operation Center
Attention Water Meter Section
231 North Whisman Road
Mountain View, CA 94043.

Street address where the water meter is installed shall be included with the shipment or delivery.

b. Meters shall be set and positioned as shown on the Standard Details. When in place, meter registers shall be oriented to read from a position on the sidewalk.

c. The Contractor shall tag all water meters that are in a bank of meters with a 2" x 2" or a one and one-half inch (1-1/2") diameter metal tag, stamped with the unit number and attached by a sealing wire to the water meter.

d. Meter shall be installed with an insulating connecting "tailpiece" (downstream meter coupling) to electrically isolate the meter from the customer service pipe for 1" and smaller services.

1. Water Meters, size 3/4": tailpiece shall be a Mueller H 10890 or Ford C38-23-2.5, installed into a 3/4" FIP X FIP threaded brass coupling. A 3/4" x 6" long PVC Schedule 80 MIP X MIP threaded nipple shall be connected to the brass coupling to electrically isolate the meter from the customer service pipe.

2. Water Meters, size 1": tailpiece shall be a Mueller H 10890 or Ford C38-44-2.625, installed into a 1" FIP X FIP threaded brass coupling. A 1" x 6" long PVC Schedule 80 MIP X MIP threaded nipple shall be connected to the brass coupling to electrically isolate the meter from the customer service pipe.

e. The 1-1/2" and 2" meters shall have an insulating flange kit. The meters shall be connected to the flange of brass material. The flange kit includes plastic sleeve fiber washers and insulating flange gaskets. The flange kit shall be CALPICO brand, or an approved equal from the latest edition of the City's Approved Material List.

1. Water Meters, size 1-1/2": meters shall have flanged ends and be connected with gasket and non-stainless steel nuts and bolts, size 5/8" x 2-1/2". Downstream meter connection shall be 1-1/2" FIP brass meter flange with a 1-1/2" x 6" long PVC Schedule 80 MIP X MIP threaded nipple connected to the brass meter flange to electrically isolate the meter from the customer service pipe.

2. Water Meters, size 2": meters shall have flanged ends and be connected with gasket and nonstainless steel nuts and bolts, size 3/4" x 2-1/2". Downstream meter connection shall be 2" FIP brass meter flange with a 2" x 6" long PVC Schedule 80 MIP X MIP threaded nipple connected to the brass meter flange to electrically isolate the meter from the customer service pipe.

f. An insulating flange with test leads shall be installed on 4" and larger services. The insulating flange shall conform to Paragraph 33-03.13 entitled, "Insulating Flanged Joints."

g. When Backflow Prevention Assemblies are installed behind water meters (all sizes), the 6" long PVC Schedule 80 MIP X MIP threaded nipple shall be installed downstream of the Backflow Prevention Assembly instead of the meter.

h. Where PVC pipe is used for the customer piping, (downstream of the meter, for any meter size), the 6" long PVC Schedule 80 MIP X MIP threaded nipple is not required.

34-03.09 Meter Boxes. Meter boxes shall be located and positioned as shown on the Standard Details or as required by the Engineer and set to the established grade with the top level. Center the reading lid opening over the water register. Change of grade resulting from landscaping shall be met by repositioning the box to suit. Boxes shall be supported along their entire perimeter with either 2" x 6" redwood blocks or bricks. After the box is installed and prior to backfilling, block meter box wall penetrations to prevent soil from entering the meter box.

34-03.10 Reduced Pressure Backflow Preventors. Where a reduced pressure backflow preventor is installed more than eight feet (8') behind the water or irrigation meter, the piping between the backflow preventor and the meter shall be encased in controlled density fill (CDF) to discourage future taps in the pipe. The piping and CDF shall be deep enough so not to interfere with the landscaping and topsoil located over the trench.

34-03.11 Fire Service Backflow Prevention Devices. Testing, certification and repair (if needed) of new backflow prevention assemblies on fire lines shall be completed by an independent contractor. Per State Health Regulation Title 17, the assemblies shall be tested and certified by a certified AWWA backflow prevention tester. The certified backflow prevention assembly test report shall be forwarded to the City's Cross Connection Control Specialist prior to acceptance of the project.

34-03.12 Abandoning Existing Water Services.

a. Services Two Inches (2") and Smaller in Size. Remove existing saddle at the main and install an all stainless steel full-circle repair clamp 15" wide with stainless bands, couplers, bolts and nuts. Coat the entire clamp with a mastic coating solution and wrap the entire clamp in 8-mil. polyethylene. Remove the water service piping within the excavation hole, including fittings and valves. Remove the meter and meter box. Salvage the meter and deliver to the Municipal Operations Center.

b. Services Four Inches (4") and Larger in Size. Remove the existing gate valve and install a blind flange. Coat the blind flange with a mastic coating solution and wrap the entire fitting with 8-mil. polyethylene. Remove the water service piping within the excavation hole, including fittings and valves. Install thrust block against the blind flange to prevent pipe movement. Remove the meter and meter box. Salvage the meter and deliver to the Municipal Operations Center. If the tee or gate valve is not in good condition as determined by the Engineer, it shall be removed. Payment for the removal of the tee or gate valve, if not caused by the operation of the Contract, shall be paid for as extra work.

34-03.13 Replacing Existing Service Saddle. When replacing an existing service saddle on all mains, only all stainless steel full circle clamp will be permitted, minimum width of fifteen inches (15") unless approved by the Engineer.

34-04 MEASUREMENT.

34-04.01 Services Two Inches (2") and Smaller in Size. Services shall be measured as one complete installed unit, including corporation stop, tubing, primed and taped fittings, curb stop, service saddle and meter box.

34-04.02 Services Four Inches (4") and Larger in Size. Services shall be measured as one complete installed unit, including water main fittings, tapping sleeve (if required), gate valve, solid bypass assembly, valve box and riser, pipe, polyethylene sleeve, bond joints, terminal cap or plug, thrust blocks and meter box.

34-04.03 Meters. Meters shall be measured as one complete installed unit, including the meter box (unless covered by Paragraph 34-04.01, "Services Two Inches (2") and Smaller in Size," Paragraph 34-04.02, "Services Four Inches (4") and Larger in Size," or noted otherwise in the Special Provisions). Meters 3" and larger shall include all valves, fittings, pipe and meter box as noted in the Standard Details.

34-04.04 Meter Boxes. Where meter boxes are specified on the Plans to be installed at service terminal points without installing meters, the meter box shall be measured as a part of the service.

34-04.05 Abandoning Existing Water Services. Existing water services to be abandoned shall be measured as one complete unit, including full circle repair clamp, band, coupling, bolts, nuts, 8-mil. polyethylene, mastic coating solution if required, blind flange if required, and removal and disposal of the remaining water service.

34-04.06 Backflow Prevention Devices. Backflow prevention devices shall be measured as one complete installed unit, including piping, valves, fittings, pipe supports, thrust blocks and concrete pad.

34-05 PAYMENT.

34-05.01 Services Two Inches (2") and Smaller in Size. The Contract price for each service shall constitute full compensation for all Work and materials required to complete the installation and testing from the water main to the curb stop, including tapping of the water main and the meter box, as required in the Special Provisions, shown on the Plans and specified herein.

34-05.02 Services Four Inches (4") and Larger in Size. The Contract price for each service shall constitute full compensation for all Work and materials required to complete the installation and testing from the water main to the terminal cap or plug, including tapping or cutting into the water main, as required in the Special Provisions, shown on the Plans and specified herein.

34-05.03 Meters and Meter Boxes. The Contract price for each meter shall constitute full compensation for all Work and materials required to complete the installation as required in the Special Provisions, shown on the Plans and specified herein.

34-05.04 Abandoning Existing Water Services. The Contract price for each water service that is abandoned shall constitute full compensation for all Work and materials required to complete the abandonment of the water service as required in the Special Provisions, shown on the Plans and specified herein.

Payment for the removal of the tee for four inches (4") or larger services, where required, that is not caused by the Contractor's operations shall be paid for as extra work.

34-05.05 Backflow Prevention Devices. The Contract price paid for each backflow prevention device shall constitute full compensation for all Work and materials required to complete the installation including testing, certification and connecting the backflow preventor to the water meter as required in the Special Provisions, shown on the Plans and specified herein.